



# EARTHQUAKES

## EARTHQUAKES

Many people do not know about Arizona's earthquake dangers. The entire state has been susceptible to some ground-shaking from time to time, although the southwestern and northwestern part of the state are typically more vulnerable. Earthquakes which occur in neighboring areas, such as California and northern Mexico, can also put us at risk depending on their magnitude.

Although there are no guarantees of safety during an earthquake, you can reduce earthquake caused injuries and property damage by following these basic tips:

## CHECK FOR HAZARDS IN THE HOME

- ❖ Fasten shelves securely to walls;
- ❖ Place large or heavy objects on lower shelves;
- ❖ Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches;
- ❖ Hang heavy items such as pictures and mirrors away from beds, couches, and anywhere people sit;
- ❖ Brace overhead light fixtures;
- ❖ Repair defective electrical wiring and leaky gas connections, these are potential fire risks;
- ❖ Secure a water heater by strapping it to the wall studs and bolting it to the floor;
- ❖ Repair any deep cracks in ceilings or foundations. Get expert advice if there are signs of structural defects; and
- ❖ Store weed killers, pesticides, and flammable products securely on bottom shelves in closed cabinets with latches .

## IDENTIFY SAFE PLACES INDOORS AND OUTDOORS

- ❖ Under sturdy furniture such as a heavy desk or table;
- ❖ Against an inside wall;
- ❖ Away from glass windows, mirrors, pictures, heavy bookcases, china buffets, or other furniture which could fall over; and
- ❖ In the open, away from buildings, trees, telephone and electrical lines, overpasses, or elevated expressways.

## EDUCATE YOURSELF AND FAMILY MEMBERS

- ❖ Contact your local emergency management office or American Red Cross chapter for more information on earthquakes;
- ❖ Teach children how and when to call 9-1-1, police, or fire department and which radio station to tune to for emergency information;
- ❖ Teach all family members how and when to turn off gas, electricity, and water;
- ❖ Have disaster supplies on hand; and
- ❖ Develop an Emergency Communication Plan and Emergency Supply Kit.



# EARTHQUAKES

## HELP YOUR COMMUNITY GET READY

- ❖ Publish a special section in your local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross, and hospitals;
- ❖ Conduct a week-long series on locating hazards in the home;
- ❖ Work with local emergency services and American Red Cross officials to prepare special information for people with special needs on what to do during an earthquake;
- ❖ Provide tips on conducting earthquake drills in the home;
- ❖ Ask representatives of the gas, electric, and water companies about providing information regarding when and how to turn off utilities; and
- ❖ Work together in your community and apply your knowledge to building codes, retrofitting programs, hazard hunts, and neighborhood and family emergency plans.



# FLOODS

## FLOODS

Arizona has experienced flooding incidents of sufficient magnitude to prompt Presidential and/or Gubernatorial disaster declarations. Flooding causes damage and destruction of homes, businesses and personal financial resources. You can take steps to protect yourself, your family and property before flood strikes by following these basic tips:

### BUSINESSES/HOMES

- ❖ Elevate, floodproof, and/or relocate buildings/homes outside the floodplain or above flood elevation on a new foundation;
- ❖ Store important documents and irreplaceable objects to avoid damage;
- ❖ Elevate or relocate furnaces, hot water heaters, electrical panels and other equipment;
- ❖ Provide openings in foundation walls that allow floodwaters in and out, thus avoiding collapse;
- ❖ Build and install flood shields for doors and other building entries to prevent floodwaters from entering;
- ❖ Install backflow valves or plugs on drains, toilets and other sewer connections;
- ❖ Elevate, relocate or protect inventory, equipment and stored hazardous materials or other chemicals in areas that may be flooded;
- ❖ Acquire and demolish homes in the floodplain;
- ❖ Install sump pumps with backup power; and
- ❖ Purchase flood insurance.

### PUBLIC WORKS/UTILITIES

- ❖ Protect or elevate ground mounted transformers;
- ❖ Elevate, vulnerable equipment, electrical controls and other equipment at waste water treatment plants, potable water treatment plants and pump stations;
- ❖ For sewer lines in the floodplain, fasten and seal manhole covers to prevent floodwater infiltration;
- ❖ Protect wells and other potable water from infiltration or flood damage by raising controls/well pipe;
- ❖ Replace low bridges or other obstructions that may induce flooding of houses or businesses; and
- ❖ Move building contents to a higher floor or store outside the floodplain.



# FLOODS



# THUNDERSTORMS/HIGH WINDS

## THUNDERSTORMS/HIGH WINDS

Thunderstorms occur throughout the year in Arizona, but most commonly during the monsoon season. Severe thunderstorms produce heavy rain, flash flooding, severe winds, hail, and lightning. All of which can be extremely hazardous. You can protect yourself, your family and property by following these basic tips:

### BUSINESSES/HOMES

- ❖ Install shutters on windows and doors or otherwise protect building openings from wind damage;
- ❖ Ensure roof-mounted equipment is securely anchored to the building;
- ❖ Install additional connections (such as hurricane straps and tie downs) to resist wind loads;
- ❖ When re-roofing a critical building, consider providing additional protection from water damage;
- ❖ Avoid gravel or ballast on single ply membrane roofs; winds could pick up and damage buildings;
- ❖ Consider underground electrical service (check on flooding hazard);
- ❖ Provide additional bracing for roof trusses;
- ❖ Reinforce existing masonry walls, columns and bond beams;
- ❖ Minimize the number and size of existing windows and other openings;
- ❖ Strengthen or select a wind-resistant exterior wall finish; and
- ❖ Inspect installation of pre-engineered metal buildings and strengthen as necessary.

### ELECTRICAL

- ❖ Provide higher grade poles for electrical distribution;
- ❖ Provide guy-wire on poles subject to failure;
- ❖ Provide emergency backup to critical facilities: emergency/portable generators or secondary feeds;
- ❖ Analyze communication lines on power poles for unacceptable loads, remove when possible; and
- ❖ Ensure right-of-way around power lines are free of trees or limbs that may cause damage.

### EMERGENCY SHELTERS, ETC.

- ❖ Structurally analyze all buildings or rooms identified as shelters and strengthen as necessary.

### TRAFFIC

- ❖ Protect traffic lights and other traffic controls from high winds.

### VEGETATION

- ❖ Thin trees to reduce wind damages and plant species that are more resistant to strong winds.



## THUNDERSTORMS/HIGH WINDS



# DROUGHT

## DROUGHT

Arizona is especially sensitive to the adverse effects of drought. Water is scarce here even during wetter years and population growth continues to increase our demand for water. We may not be able to control the weather, but through proper planning and preparedness, we can greatly reduce the severity of impacts. You can help reduce Arizona's drought vulnerability by practicing a low water use lifestyle and implementing these basic tips:

## COMMUNITIES/UTILITIES

- ❖ Communicate drought conditions, increase outreach and provide conservation tips to water users;
- ❖ Develop and implement a conservation program;
- ❖ Develop a drought plan;
- ❖ Improve infrastructure and storage facilities;
- ❖ Develop alternative/backup water supplies;
- ❖ Consider water wasting ordinances (such as turf restrictions, drought-related watering schedules);
- ❖ Increase use of reclaimed effluent for commercial landscaping, public facility landscaping, street sweeping, etc.;
- ❖ Develop and adopt a water rate structure that encourages conservation (higher rates for higher water use);
- ❖ Discourage developers from requiring turf in residential developments;
- ❖ Provide incentives for large turf users (golf courses, common areas of subdivisions) to use non-potable supplies (such as reclaimed effluent);
- ❖ Encourage restaurants to provide water only upon request; and
- ❖ Encourage hotel/motels to implement linen & towel replacement programs.

## HOMES

- ❖ Landscape with drought-tolerant/low water use plants;
- ❖ Repair irrigation system leaks;
- ❖ Reset irrigation timers seasonally;
- ❖ Avoid outdoor watering during hottest part of the day;
- ❖ Eliminate runoff from property and reduce overspray from sprinkler systems;
- ❖ Comply with water wasting ordinances;
- ❖ Reduce discretionary outdoor water uses (home car washing, pool refills, etc.);
- ❖ Implement water harvesting practices (rainwater capture);
- ❖ Use commercial car washes that recycle water;



# DROUGHT

*(Homes continued)*

- ❖ Use covers to reduce evaporation from pools;
- ❖ Divert pool back wash to landscaping rather than discharging into the street or alley;
- ❖ Replace high water using plumbing and fixtures with low-flow fixtures; and
- ❖ Conduct home water audits and leak detection. Fix leaking faucets and replace faulty fixtures.





# WINTER STORMS

## WINTER STORMS

Heavy snowfall and extreme cold can immobilize certain areas in Arizona. Even areas that normally experience mild winters can be hit with a major snowstorm or extreme cold. Winter storms can result in flooding, storm surge, closed highways, blocked roads, downed power lines and hypothermia. You can protect yourself, your family and your property by following these basic tips:

## BUSINESSES/HOMES

- ❖ Winterize your business and/or home to extend the life of your fuel supply by insulating walls and attics. Caulking and weather-stripping doors and windows, and installing storm windows or covering windows with plastic;
- ❖ Winterize your house, shed or any other structure that may provide shelter for your family, neighbors, livestock or equipment. Clear rain gutters; repair roof leaks and cut away tree branches that could fall on a house or other structure during a storm;
- ❖ Insulate pipes with insulation or newspapers and plastic, and allow faucets to drip a little during cold weather to avoid freezing;
- ❖ Have a contractor check the structural ability of the roof to sustain unusually heavy weight from the accumulation of snow or water; and
- ❖ Create an Emergency Supply Kit and include:
  - ❖ Rock salt to melt ice on walkways;
  - ❖ Sand to improve traction; and
  - ❖ Snow shovels and other snow removal equipment.

## PREPARE YOUR CAR

- ❖ Install good winter tires or make sure the tires have adequate tread. All-weather radials are usually sufficient for most winter conditions. Some jurisdictions may require snow chains depending on road conditions.



# WINTER STORMS

## DRESS FOR THE WEATHER

- ❖ Wear several layers of loose fitting, lightweight warm clothing rather than one layer of heavy clothing. The outer garments should be tightly woven and water repellent;
- ❖ Wear mittens, which are warmer than gloves;
- ❖ Wear a hat; and
- ❖ Cover your mouth with a scarf to protect your lungs.



# WILDFIRES

## WILDFIRES

Wildfires burn thousands of acres in Arizona annually causing injury to people, and damaging property and the environment. Dry conditions at various times of the year greatly increase the potential of wildfires. People who own homes in or near forested/grassy areas are vulnerable to these destructive fires. You can protect yourself, your homes and your businesses from wildfires by following these basic tips:

## CREATE AND MAINTAIN A DEFENSIBLE SPACE AROUND YOUR HOME AND OTHER OUTDOOR STRUCTURES

- ❖ Thin and remove vines, trees, shrubs, tall grass and other flammable vegetation within 30 feet of your home;
- ❖ Prune bushes and shrubs, remove dead leaves and overhanging branches;
- ❖ Regularly clean your roof and gutters by removing leaves, branches and pine needles/cones;
- ❖ Remove trash and debris near your property;
- ❖ Landscape with fire resistant plants;
- ❖ Place woodpiles and wooden picnic tables away from structures; and
- ❖ Store combustible or flammable materials in approved safety containers away from structures.

## CREATE A SECONDARY SAFETY ZONE AT LEAST 125 FEET AROUND STRUCTURES

- ❖ Remove fallen trees and firewood debris;
- ❖ Trees or bushes should be thinned to maintain 10 feet between tree canopies;
- ❖ Trim trees up from the ground to eliminate ladder fuels; and
- ❖ Ask the power company to clear branches from power lines.



# WILDFIRES

## ADDITIONAL TIPS FOR HOMEOWNERS, BUSINESSES AND LOCAL OFFICIALS

- ❖ Replace roof with fire-resistant materials;
- ❖ Identify more than one means of access into and out of a community;
- ❖ Provide fire breaks to prevent the spread of fire; and
- ❖ Provide fire roads to aid in firefighting.



# EARTH FISSURES

## EARTH FISSURES

Earth fissures occur in areas that have subsided due to extensive groundwater withdrawal, where the ground has compacted unevenly when the groundwater table drops. Four counties in Arizona are particularly susceptible to earth fissures: Pinal, Maricopa, Cochise and Pima.

Earth fissures cause damage to infrastructure (utility lines, roads, canals, etc.) and buildings, change flood and drainage patterns, and pose a life safety risk. Additionally, earth fissures are a direct path to the groundwater table, so pollutants and contaminants placed within the fissure will impact water quality fairly quickly. Earth fissures are a long-term problem, and will continue to form as long as subsidence continues unchecked.

Reducing the occurrence of earth fissures and their associated effects is a community effort. Below are some tips:

## UTILITIES, PUBLIC WORKS, AND TRANSPORTATION

- ❖ Lessen dependence on groundwater by using alternative sources;
- ❖ Be aware of where fissures are located and avoid building infrastructure through, on, or over them;
- ❖ Avoid routing drainage into fissures: watering fissures makes them grow;
- ❖ Ensure alternate emergency routes exist where fissures cross existing roads; and
- ❖ Monitor storm and sewage drains for flow reversal.



# EARTH FISSURES

## PLANNING AND ZONING

- ❖ Encourage developers to avoid fissure-prone areas;
- ❖ Require a minimum setback for buildings/infrastructure in fissure areas; and
- ❖ Prohibit residential zones in fissure areas.

## HOMEOWNERS

- ❖ Educate yourself on fissures before buying property in fissure-prone areas;
- ❖ Carefully read the disclosure before buying; and
- ❖ Fence off the fissure to keep animals and children out.

## EVERYONE

- ❖ Practice smart water conservation—even if you don't live in a fissure-prone area, your water consumption may be contributing to fissure formation in other areas;
- ❖ Do NOT dump garbage, appliances, manure, or other contaminants into fissures; and
- ❖ If you see something you suspect is a fissure, report it to the Arizona Geological Survey.